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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER				
SHEVIN, MARK L				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/562,154

Applicant(s)

BOGER ET AL.

Examiner

MARK L. SHEVIN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 19 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-38 is/are pending in the application.
- 4a) Of the above claim(s) 7-14, 16-18, 20-34, 37 and 38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 4-6, 15, 19, 35 and 36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Status of Claims

1. Claims 1 and 4-38, filed July 16th, 2008, are currently under examination. Compared to the claims filed December 23rd, 2005 as a preliminary amendment and examined in the previous Office Action mailed April 17th, 2008:

Amended: Claims 1 and 4-5,

Cancelled: Claims 2 and 3

Withdrawn: Claims 7-14, 16-18, 20-34, and 37-38

New: Claims 16-38

Election of Species Requirement

2. Claims 7-14, 16-18, 20-34, and 37-38 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on December 19th, 2008.

This application contains claims 7-14, 16-18, 20-34, and 37-38 drawn to an invention nonelected with traverse in the reply filed on December 19th, 2008. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Status of Previous Objections

3. The previous objections to claims 2 and 3 in the Office Action dated April 17th, 2008 have been **withdrawn** in view of the cancellation of claims 2 and 3.

Status of Previous Rejections

4. The previous rejection of claim 1 under 35 U.S.C. 102(b) and/or 103(a) over **Peng** (CN 1413797) in the Office Action dated April 17th, 2008 has been withdrawn in view of the amendments to claim 1.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. The previous rejections of claims 2-4 under 35 U.S.C. 103(a) over **Peng** in view of **Ishii** (US 5,916,635) in the Office Action dated April 17th, 2008 have been withdrawn in view of the cancellation of claims 2 and 3.

6. The previous rejections of claims 5-6 under 35 U.S.C. 103(a) over **Peng** in view of **Ishii** and **Englert** (EP 1287941) in the Office Action dated April 17th, 2008 have been withdrawn in view of the amendments to claims 1, 5, and 6 and the cancellation of claim 3.

7. The previous rejections of claims 1 and 3 under the doctrine of nonstatutory obviousness-type double patenting over claims 1, 14-17, and 20 of co-pending application 11/996,712 have been withdrawn in view of the amendments to claim 1.

8. The previous rejection of claim 1 under the doctrine of nonstatutory obviousness-type double patenting over claims 1, 14, and 24 of US 2008/0038471 has been withdrawn in view of the amendments to claim 1.

Claims Objection

9. **Claim 4** is objected to for the same reasons as presented in the previous Office Action dated April 17th, 2008.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. **Claims 4, 5, 10, and 35** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention

Claim 4 recites the limitation "...the proportion of organic polymer..." in the second line of claim 4. Similarly, claim 5 recites the limitation "...the polymer used is..." in the first line of claim 5. There is insufficient antecedent basis for these limitations in the cited claims because the independent claim 1 does not mention the "base material" as being a polymer.

Regarding Claim 35, the term "few" in claim 35 is a relative term which renders the claim indefinite. The term is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 103

11. **Claims 1, 4, 15, 19, 35, and 36** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Peng** (CN 1413797 – Full Translation) in view of **Ishii** (US 5,916,635).

Peng:

Peng discloses a method of soldering aluminum and copper pipes together using an active connection agent prepared from nanometer powder which was added to water, organic cellulose, and flux through mixing. Thus nanoparticles are added to a base material to produce a non-corrosion flux. The nanoparticles has a size range of 20 nm - 100 nm (claim 2). The active bonding agent of Peng's invention includes nanopowder, a non-corrosive flux, and a binder (p. 5, para 2) and the material is designed for brazing (p. 7).

Peng is silent as to the volume percentage and particular type of the nanoparticles in the brazing flux material.

Ishii:

Ishii is drawn to producing hydrophilic coatings for the aluminum fins of heat exchangers (Abstract). Such hydrophilic coatings are used to let condensing water spread out over the surface of fins rather than forming globules which increase resistance to air flow and lower heat exchanger efficiency (col. 1, lines 20-35).

Hydrophilic coatings are produced by spreading a mixture of colloidal silica (Silicon dioxide, SiO_2), water-soluble polymers, and anionic surfactants over aluminum fins and drying by heating (col. 3, lines 1-10). The colloidal silica may be alkali-stabilized silica with a particle diameter of 5 to 100 nm, preferably 10 to 30 nm (col. 3, lines 19-25).

The total weight of the polymer and silica nanoparticles in the mixture is 4 to 20 wt% (col. 3, lines 9-10).

Regarding claims 1, 4, and 15, it would have been obvious to one of ordinary skill in the metallurgy arts, at the time the invention was made, to combine Peng in view of Ishii to modify the brazing flux of Peng to include from 0.01 to 10 vol% of any one of the listed types of nanoparticles (in particular oxide nanoparticles) as Ishii taught the inclusion of colloidal silica nanoparticles in a coating composition designed to be coated on aluminum materials and heated, just as with Peng's brazing flux.

Ishii taught that the total weight of polymer and nanoparticles should be in the range of 4 to 20 wt% and the Examiner holds that the content of nanoparticles and residual polymer would overlap the claimed ranges of 0.01 to 10 vol% and 0.1 to 1 vol% when converted to volume percent. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges of nanoparticles and residual polymer content through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980). MPEP 2144.05, para I states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."

Regarding claim 19, the nanoparticles are silica, which is an oxide of silicon and is used to produce a hydrophilic coating (Abstract).

Regarding claims 35 and 36, it would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed size ranges of nanoparticles through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. Peng disclosed the nanoparticles as being in the range of 20 nm - 100 nm (claim 2) but did not give reasons for this size range while Ishii taught that the nanoparticles should be in the range of 5 nm (reads on 'few nanometers') – 100 nm because the particles agglomerate below about 5 nm and adversely affect the stability of the coating composition when larger than 100 nm (col. 3, lines 1-35).

12. Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Peng** in view of **Ishii** as applied to claims 1, 4, 15, 19, 35, and 36 above, in further view of **Englert** (EP 1287941 – Full translation).

The disclosures of Peng and Ishii were discussed above, and while Ishii teaches synthetic resins (col. 4, lines 4-10), he also teaches that such polymer components undergo excessive curing and become fragile after heating above 280 °C (col. 7, lines 15-26). Furthermore, neither Peng nor Ishii teaches the composition of the flux.

Englert:

Englert addresses these deficiencies and is drawn to a flux composition for brazing of aluminum parts (Title and para 0001). The preferred flux is

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NOCOLOK™ a potassium fluoroaluminate, preferably $K_{1-3}AlF_{4-6}$ in the form of a eutectic with a melting point of 562-572 °C (para 0003 and 0018). The flux is mixed with a solvent and binder where the binder is a polymer such as polyurethanes, synthetic resins, phthalates, acrylates, vinyl resins, or polyolefins and the binder is present between 0.1 and 30 wt% (para 0016 and 0020). The advantage of using Englert's inventive flux is that it overcomes the problems associated with fluxing of aluminum-based parts for soldering, such as post-fluxing cleaning (para 0006-0008).

Regarding claim 5, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to combine Peng in view of Ishii and Englert to form a flux with nanoparticles that includes a polymer that can withstand the demands of brazing as Ishii teaches that his polymeric binders will have poor results after heating to normal brazing temperatures and thus one would look to modify Ishii by looking to other polymeric binders for use in a brazing flux composition as taught by Englert and reinforced by Peng's disclosure of nanoparticles in a flux composition. Englert teaches that his flux including polymeric binders is used for brazing of aluminum at temperatures of above 450 °C and preferably above 560 °C.

Regarding claim 6, it would have been further obvious to one of ordinary skill in the art to chose a proven flux for aluminum in Nocolok ($K_{1-3}AlF_{4-6}$) as disclosed by Englert as Englert teaches that his flux for brazing aluminum overcomes the prior art problems associated with fluxing of aluminum based parts for brazing.

Response to Applicant's Arguments:

13. Applicant's arguments filed July 16th, 2008 have been fully considered but they are not persuasive.

Applicants assert (p. 7, para 3) that it would not have been obvious to combine Peng and Ishii because the coating of Ishii is "widely divergent from the connection agent of Peng" and the coating of Ishii is not disclosed or suggested as being used in a joining process such as soldering or brazing.

In response, obviousness only requires a reasonable expectation of success (MPEP 2143.02) and Ishii taught the inclusion of colloidal silica nanoparticles in a coating composition designed to be coated on aluminum materials and heated, just as with Peng's brazing flux, both materials had nanoparticles of about the same size range and contained binders of water soluble polymers.

Conclusion

-- Claims 1, 4-6, 15, 19, 35 and 36 are rejected

-- No claims are allowed

The rejections above rely on the references for all the teachings expressed in the texts of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any

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amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588 and fax number is (571) 270-4588. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy M. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Mark L. Shevin/
Examiner, Art Unit 1793

March 14th, 2009
10-562,154

/George Wyszomierski/
Primary Examiner
Art Unit 1793